

# The Construction Process

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# The Construction Process

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After months of planning, design, site selection, financing and marketing, it is finally time to bid the project and embark on the construction phase. Bidding options include the following:

- Bid the project in the traditional fashion with a single contract and a general contractor?
- Use a single general contractor and multiple primes?
- Use a construction manager and multiple bid packages?
- Use a construction manager at risk?
- Consider design/build?

Any one of these methods can lead to a successful project. It is the intent of this chapter to discuss and define the delivery methods mentioned above, and offer the pro's and con's for each, in order for the district to choose the most beneficial contracting arrangement. The project delivery method may be selected in the planning and design phase of project development. The decision on which delivery method would work best should be considered by the entire team involved in the project. The only way to have a successful project is to utilize the team approach throughout the entire duration from project inception to project completion.

## I. DESIGN / BID / BUILD

### **Single General Contractor / Single Prime**

The traditional method of utilizing a single contract with a general contractor is most commonly known as design / bid / build. Under this concept, a complete set of plans and specifications is prepared by the architect and released for bidding to responsible general contractors. The general contractor then solicits bids from subcontractors. These subcontractors, when awarded a contract, become contractually obligated to the general contractor. Under this method, the general contractor assumes all the risk for the construction of the project. The first step is to locate responsible general contractors. One way this can be accomplished is by providing language in the bid documents

that each perspective bidder must be prequalified with agencies such as the Capital Development Board (CDB), Illinois Department of Transportation (IDOT), City of Chicago, etc. In order to prequalify for a project, each contractor must submit verification of financial capability to perform the work and records of positive performance from previous / similar projects. The district and the architect can then evaluate each contractor and perform telephone verification of each bidder's references.

### **Single General Contractor / Multiple Primes**

This method of contracting involves the use of a single general contractor with separate prime subcontractors bidding directly to the district instead of to the general contractor. The most common prime subcontractors are heating, ventilation, fire protection, plumbing, and electrical. Each of these trades will bid direct to the district, usually two weeks prior to the general contractor's bid. After receipt of the general contractor's bids, the successful prime subcontractors are assigned to the general contractor for supervision and coordination. The district holds contracts directly with the general contractor and each of the prime subcontractors. This type of contracting allows the district more control over payments to each of the prime subcontractors; however, it does require more involvement and management from a district representative.

### **Bid Stage**

Consideration of the bid date is critical to a successful project. Availability of contractors and time of year, are key factors in receiving the most competitive bids. The architect and the district need to decide when is the best time to bid and prepare the advertisement for bids. The advertisement for bids is required by law to alert the public and the construction industry that a school project will be out for bid. The advertisement states the date, time and place where the bids are to be received, where the bidding documents can be obtained, if a plan deposit is required, a brief description of the project, and any special requirements for preparing and submitting the proposal. The requirements for advertising are usually met through an announcement in a newspaper or in other legal news publications. The advertisement is normally placed four to six weeks prior to the bid date, depending on the size and complexity of the project. During the time a project is out for bids, several addenda may be issued. Addenda are supplemental instructions issued by the architect which modify or change any part of the original plans and specifications. Each bidder is required to acknowledge the receipt of any and all addenda issued as outlined on the bid form.

### **Bid Bonds**

Under the design / bid / build method of contracting of single general contractor / single prime, the general contractor's submitting proposals will be required to include a bid bond attached to the bid form. Under design / bid / build method of single general contractor / multiple primes, the general contractor and each prime subcontractor must submit a bid bond with each proposal. A bid bond is a legal instrument issued by a licensed surety as an insurance policy to protect the district in the event the general contractor fails to enter into an agreement with the district for the price submitted. The standard bid bond amount is normally 5 percent of the bid price. In the event the low bidder refuses to enter into an agreement with the district, the district may "call" the bond, meaning that the low bidder will be required to pay the district 5 percent of its bid price to assist in the additional expense the district may incur to go to the next responsible bidder. This situation is seldom experienced with the use of prequalified contractors. The cost associated with providing this bond is the responsibility of the

general contractor in a single contract situation, or by each prime subcontractor and the general contractor in a multiple contract situation.

## **Award**

After a successful bid opening, having secured a price within the budget and a responsible general contractor, an award and contract can be developed. Industry-wide standard documents are normally used and include AIA 101 and 201. The wording of the contract is very critical and should tie the general contractor to each specific plan sheet and each specific specification section and page. Also to be included, is a listing of any addenda that were issued during the course of the bidding stage. It is critical that the district's legal counsel be involved in the preparation and review of all contracts. The AIA standard documents contain wording that has been tested and proven over many years and should not be altered.

## **Performance and Payment Bonds**

With the signing of the contracts, another series of bonds will be furnished by the general contractor or each prime subcontractor, depending on the contracting method. These are known as performance and payment bonds. These bonds are insurance policies to the district to insure that the general contractor and/or prime subcontractor perform all work in accordance with the plans and specifications and promptly pays all of its subcontractors and material suppliers. If the general contractor and/or prime subcontractors fail to meet the schedule agreed upon or falls behind in paying its subcontractors or material suppliers, the surety company that issued the bonds, after written legal notice, can solicit other contractors to bid on completing the work. Any additional expense incurred in this situation is borne by the surety company. This again is a very rare situation, especially with prequalified contractors. Surety companies that issue these bonds have different ratings as to their financial stability. The district should require, by stating in the bid specifications, that only the highest rated sureties be acceptable for furnishing these bonds.

## **Insurance**

The general contractor and/or each prime contractor are required to provide evidence of and maintain insurance throughout the duration of the project. Several policies are required, including:

- Comprehensive automobile liability insurance for coverage of owned, non-owned and hired vehicles with \$1,000,000 bodily injury and property damage liability limit for each occurrence.
- Worker's compensation, in accordance with the provisions of the Illinois Worker's Compensation Act.
- Commercial general liability insurance, including coverage for premises and operations, broad form property damage, products completed operations, independent contractor's personal injury liability and contractual obligations. The general aggregate limit on a per project basis should be as follows:
  - \$1,000,000 bodily injury per person.
  - \$1,000,000 bodily injury aggregate limit.
  - \$500,000 property damage per occurrence.
  - \$1,000,000 property damage aggregate limit.
- Builders Risk Insurance for work and property installed until substantial completion for the entire project.

- Acceptable insurance companies should meet the following standards:
  - Current Best's rating of any level of "B" or better.
  - Licensed in the State of Illinois by the Illinois Department of Insurance (IDI).
  - Coverage by the Insurance Guaranty Fund.
  - Proof of insurance shall be a binder or certificate or the complete insurance policy.

### **Construction Administration**

The construction administration under the design / bid / build delivery method is typically provided by the architect and general contractor or each prime subcontractor. Under a contractual provision for architect observation, the architect will provide one or more representatives on-site to facilitate the progress of the project and observe the installation of critical systems or components. The architect will also verify that specified materials are installed and will observe all field tests for compliance with the contract documents. Other duties should include field clarification of the plans and specifications. The general contractor will also provide the same services through his project superintendent and project manager. It is extremely important to maintain communication with the local city or village inspectors and administrators during all phases of construction. There may be special inspections and sign-offs required by these agencies before the project may proceed. Early communication and cooperation with the local governing agencies is very important.

A key element in construction administration is the gathering of submittals and shop drawings. Possibly the most important submittal to prepare is the project schedule. The project schedule is the time line that establishes when and how long the various divisions of work will take to complete. Common practice with school construction is to establish the starting date and the completion date during the planning and design stage and incorporate these date into the bidding documents. The project schedule is prepared by the general contractor and is updated monthly. Updates should reflect actual dates of completed tasks in relation to scheduled progress. Several types of schedule formats are used and may include the critical path method, bar chart or arrow diagram.

In addition to the schedule, the general contractor and/or prime subcontractors will submit a schedule of values. The schedule of values is a detailed breakdown of the contract amount into labor and material cost for each section of work and each subcontractor. This schedule forms the basis for each pay progress meeting.

The next series of documents to be submitted are shop drawings, product data, and samples. These submittals are gathered by the general contractor or each prime contractor and sent directly to the architect for review and approval. These submittals will ensure that the contractors will incorporate the specified materials and equipment into the project. The architect will involve the district in approval of items which require color selection or texture verification or any other items which may be of significant importance to the district. Once a submittal is approved, the district will be furnished with the approved copy for its records. It is very important that both the architect and contractor maintain a submittal log in order to track the timing of the submittal delivery and review. The submittal log is a listing of all submittals, samples, and product data required by the specifications. It will contain columns for recording the date of submission by the contractor, the date of return to the contractor by the architect, whether the

submittal was approved or rejected, and any comments or notes concerning the product or drawings. This document will play a key role in determining the responsible party if the project falls behind schedule or is delayed due to the availability of materials or equipment.

## **Payment**

Pay meetings are usually held once a month on a regular predetermined day and time. As mentioned earlier, the document submitted and discussed is the contractor's schedule of values. It is prepared by the general contractor, or each prime subcontractor, and will indicate percentages of completion for each line item of work. There may also be a request for payment for stored materials. In order to maintain the schedule and be assured of the availability of materials when they are needed, the general contractor and/or the subcontractors may order materials and equipment earlier than actually needed and store them either on site, in a job trailer, in the contractor's shop, or in a warehouse. If payment for stored materials is requested, it is the responsibility of the architect and a representative of the district to inspect and verify that the materials are truly stored and in the quantities requested. The contractor must be able to show proof of title and insurance coverage for the materials before payment is approved.

Except for the first pay request, each subsequent pay request will include lien waivers from the general contractor and each of the subcontractors and suppliers. A lien waiver is a signed legal instrument stating that the contractor, subcontractor, or supplier has been paid for the services provided that month, in the amount requested on the application for pay, and waives any rights to file a lien against the district for failure to pay. Lien waivers should be checked very carefully as the district will be ultimately responsible for payment of goods and services specifically provided for the project. It is the general contractor's responsibility to make sure that all lien waivers are collected and turned over to the district.

## **Retainage**

Current industry practice in making payments to the contractor is to withhold retainage from each monthly pay request. Retainage, normally 10 percent of the amount requested, is withheld in order to protect the district when having to rectify deficient work or delays in completion. It is becoming more common to reduce the amount of retainage to 5 percent once the project has reached 50 percent completion and is on schedule. This provides an incentive to the contractor by freeing up more working capital and establishes a good working relationship with the district.

## **Change Orders**

Inevitably, every construction project will encounter an unforeseen condition or ambiguity in the plans and specifications. When this occurs, the architect or owner will initiate a request for proposal (RFP). This is a formal written request for the affected contractor and/or subcontractor to prepare a detailed written estimate of what the changes in scope of work will cost and how much additional time will be required to complete the work. Once the estimate is received, it can be reviewed and, if acceptable to all parties, will be incorporated into a change order. Change orders adjust the contract amount either up or down, depending on the scope change. In order to maintain the budget, it is imperative to try and keep the number of change orders to a minimum. There should be contingency built into the budget to cover change orders and any other unforeseen conditions. The contingency could also be used to pay for overtime or temporary

enclosures to keep work moving in inclement weather. Both design contingency and construction contingency should be allowed for in the budget, and they should be developed by the district and the architect during the planning phase.

### **Dispute Resolution**

Everyone on the team wants to see the successful completion of the school project with the least amount of conflicts or problems. Sometimes situations arise that cannot be easily resolved. When an agreement cannot be reached between parties, a dispute occurs. To avoid getting to this stage in the first place, partnering may be used. Partnering involves a voluntary preconstruction agreement between all subcontractors and suppliers to provide timely submittals, general cooperation between trades, and overall commitment to the project success. It is a noncontractual but formally structured agreement between the parties to perform the work on a team-based approach, emphasizing that working together creates success. Disputes are normally held to a minimum when partnering is incorporated into the project.

Even with the best preplanning and agreements to cooperate, disputes do occur. Alternative dispute resolution may be incorporated into the contract documents. Alternative dispute resolution is a binding agreement between the parties to exercise good faith efforts to resolve disputes or claims fairly, amicably, and in a timely manner. Alternative dispute resolution may be accomplished through a dispute resolution board or mediation.

### **Project Closeout**

The first step to project closeout, is to establish a substantial completion date and prepare a punch list. A building is considered substantially complete when it can be safely occupied for the use intended, and all systems have been tested and are in proper order. It is common practice to release a portion of the retainage when substantial completion is established. The architect and district can decide how much retainage to withhold on a case-by-case situation. The local municipality will have specific requirements for health / life safety issues that will have to be tested and approved before substantial completion can be established. After substantial completion is established, the district may proceed with moving in equipment and furnishings. A project may have areas established as substantially complete before the entire project is completed. This will allow the district to move into those areas which may need to be used ahead of final completion, such as a cafeteria or gymnasium. Prior to allowing the district to move in, the architect and general contractor will prepare a punch list. This is a detailed room-by-room listing of incomplete or deficient items of work which must be completed by an agreed-upon date, usually three to four weeks after the date of substantial completion. The district representative may also be included in the punch list inspection. After completion of the punch list, the architect will issue a certificate of final acceptance to the general contractor. Final acceptance means that all punch list items have been completed and all deficiencies have been corrected.

Although the building is now officially complete, several submittals still must be gathered before the final payment is released to the contractor. An extremely important document to be submitted, and one that should be kept by the district in a very secure place, is the set of project record drawings or, as commonly referred to, as-built drawings. This is a set of drawings that are required to be kept at the job site by the general contractor, throughout the course of construction, to record daily any changes that are

made to the layout or location of utilities, outlets, ductwork, cabling, sprinkler piping, wall locations, etc. During the course of construction, sometimes minor adjustments have to be made in order for all the systems and components to “fit” in the required spaces. These are the changes that are placed on the project record drawings. Other submittals required include guarantees and warranties for all items as required by the specifications. The general contractor is required to guarantee all work for a period of one year, or such longer period as may be specified in the contract documents, to be free from defects in workmanship, materials, and equipment. Specific extended warranties are usually required for, but not limited to, heating and air-conditioning equipment, temperature controls, roofing, carpet, finish hardware, plumbing fixtures and controls, and electrical equipment and fixtures. The specifications will contain a listing of all items which require extended warranties. It should be noted that the guarantee and warranty period starts at the date of substantial completion.

In order to keep your new building in top shape, operation and maintenance manuals will be submitted by the general contractor or each prime subcontractor. These manuals contain critical information on the proper operation and care of equipment and finishes. There will also be a start-up and training session held with the district’s operating personnel so that those people responsible for keeping things running smoothly are properly informed about the systems, utilities, and equipment that make the building operate. This session is normally held at substantial completion before the building is occupied. Once all the closeout documents are received and approved, and the final acceptance certificate is in hand, it is time to release the final payment to the general contractor, including all retainage.

## **II. CONSTRUCTION MANAGEMENT AS AGENCY**

This delivery method involves the use of a construction manager as an independent adviser to the district on construction issues. The construction manager is responsible for the administration and coordination of multiple prime or trade contractors. In seeking the services of a construction manager, the district may prepare and issue a RFP to potential firms. The RFP should be specific in defining the scope of services requested by the district. It should contain a detailed description of the project scope and schedule, and the criteria that will be used in selecting the successful firm. The criteria should include similar project experience, references, resumes of key personnel and fees. Once the construction manager is selected, the fee is negotiated. Unlike the design / bid / build method of subcontracting where the cost of construction is known at the bid opening, the construction manager may release multiple bid packages at different stages of construction. It is the construction manager’s responsibility to develop a budget for each bid package and compare the actual bid numbers to the budgeted amount. The construction manager agreement may also include a guaranteed maximum price (GMP), provided the construction manager does not share in any project cost savings below the guaranteed maximum price. The construction manager is also responsible for developing and maintaining the construction schedule and manages the input of the various trade contractors, just as a general contractor would. Under the construction manager, the trade contractors for the various bid packages become prime

contractors to the district. The construction manager as agency performs no construction work itself, therefore eliminating any monetary interest in the actual labor and materials incorporated into the project.

### **Bid Stage**

Using a construction manager as agency, there will normally be multiple bid packages for various components of the project and multiple bid dates. The advertisement for bids is announced in the same manner as with the design / bid / build delivery method. It should be the construction manager's goal to receive a minimum of three proposals for each bid package. The construction manager will recommend the number of bid packages to be released and what components of work will be included in each package. For instance, early release packages may include site work and site utilities, foundations and slab work or the furnishing and erection of the structural steel. This work may then be bid and awarded prior to the completion of remaining bid packages, to allow for an early start on the schedule. These components of the work could start well ahead of the final design and provide an additional early start for the entire project schedule. Bid packages can also be released with respect to market conditions and time of year in order to receive the most competitive bid prices. The construction manager may recommend the preordering of long lead time components of the project, such as brick, windows, structural steel, food service equipment, etc. This further ensures that materials, which are critical to have on hand to meet the schedule, are available when needed. The construction manager may also request each trade contractor to furnish hourly rates they would charge in the event of changes to the scope of work.

### **Bonds**

Bonds under the construction manager method of delivery, are basically administered in the same way as the design / bid / build, except that each contractor bidding on the different bid packages, will furnish its own bid bond, and upon award of a contract, its own performance and payment bonds. Each bidding contractor is responsible for the cost of furnishing bonds. The bonds will still be payable to the district, with the construction manager managing the individual contracts and contractors for compliance with the schedule and construction documents.

### **Award**

The standard AIA documents discussed earlier are used to award the various bid packages to the contractors. Here again, each contractor is a prime to the district and is managed by the construction manager. Wording of the contracts may vary from the design / bid / build method and should be negotiated by the construction manager and the district. The district's legal counsel should always be involved in the wording of the contracts.

### **Submittals and Shop Drawings**

Using the construction manager method of delivery, the project schedule will be developed somewhat differently than with design / bid / build. Each bid package may have its own individual schedule for completion; however, the construction manager will be responsible for blending these individual schedules into a master schedule. The critical path method of scheduling is probably the most efficient and controlling way of keeping the project on track. Critical path scheduling involves establishing milestone dates for each portion of work that must be met in order to keep the project on

schedule. Establishing milestone dates means that certain portions of work are critical to be completed before the next portion of work can start, i.e., foundations must be completed before steel erection can start.

With the construction manager, each individual contractor will submit its own schedule of values and list of subcontractors. They will also be submitting their own shop drawings, product data, and samples to the construction manager for review and forwarding to the architect. The district still remains involved in the selection of colors and texture and in the approval of critical items of equipment. The construction manager and the architect will maintain the submittal log just as in design/bid/build.

### **Construction Administration**

The extent and involvement of the construction manager in construction administration, is normally negotiated as part of the construction manager's contract with the district. Typically the construction manager will provide full time supervision throughout the entire duration of the project and will act as the district's representative in witnessing all testing and installation of materials. When employing a construction manager, the district will need to negotiate responsibilities and involvement with the architect to determine the fee structure for each. This is the type of monetary trade-off that must be considered when choosing the delivery method that works best for an individual district. The extent of the services provided by the construction manager will vary with each individual firm and should be discussed during the interview process. The construction manager will be responsible for reporting to the architect and the district on the progress, cost, and quality of the construction, as well as the dates and times of crucial inspections.

### **Payment**

The same procedures as described in the design / bid / build section also apply with construction management. Pay meetings are normally held once a month. Under construction manager, a schedule of values showing percentage of completion for each line item of work is submitted by each trade contractor. The construction manager, architect, and district representative will review each application and discuss the dollar amounts requested. Payment for stored materials may be requested and is handled as previously discussed, as is the collection of lien waivers. Retainage is withheld in same way as with design / bid / build, except at the discretion of the construction manager and district, a portion of the retainage held on the early release packages may be paid to the contractor at the completion of work, rather than holding it until the completion of the entire project. This practice is becoming more widely accepted in the industry and, if explained in the specifications prior to bidding, may result in more favorable bid prices. RFP's and change orders follow the same procedures as the design / bid / build scenario, except that the architect, owner, or the construction manager may initiate the request. Contingencies are to be included in the budget, as previously discussed, and usually are established by the construction manager, as he will be the responsible party for developing and maintaining the budget. Hourly rates should be obtained from each prime contractor by the construction manager and used as before to control the cost of change orders.

### **Dispute Resolution**

Both partnering and dispute resolution can be incorporated into the project when using a construction manager. These issues are normally discussed with the construction

manager prior to the release of bid packages since the construction manager will be acting as the district's representative in the case of disputes.

### **Project Closeout**

Project closeout follows the same procedures as with design / bid / build, except that closeout documents must be received from each of the trade contractors. The construction manager will be responsible for gathering all the documents required and distributing them to the district and architect.

## **III. CONSTRUCTION MANAGER AT RISK AND DESIGN BUILD**

### **Construction Manager at Risk**

As of the printing of this document, employing a construction manager at risk is not an option for consideration in Illinois on school construction projects. We will briefly explain how this type of contracting method operates in the future, in the event future legislation is ever approved to accept this delivery method in Illinois. The construction manager at risk is allowed in other states on public and school projects.

Under construction manager at risk, as described in this section, the construction manager holds all contracts. The construction manager is actually the general contractor and will perform certain items of work just as a general contractor would. Before going out for bids, the construction manager will provide the district with a guaranteed maximum price for the project. The construction manager then assumes all monetary risk if the bid or possibly the entire project cost, exceeds the guaranteed maximum price. The fees for construction manager services are included in the guaranteed maximum price. Under this delivery method, architectural involvement is still performed under a separate contract.

### **Design Build**

The design / build is a concept which is still developing. Usually, design / build describes a single source of contracting responsibility where the contractor is both the designer and constructor. This delivery method streamlines communication with the district and simplifies the entire contracting process. Speed and cost reductions are often cited as key advantages to design / build. Under contractor-led design / build, the contractor assumes full responsibility to the district for all phases of the project. In the other forms of contracting, there is a check and balance system between the architect/engineer and the contractor. Under this form of design / build, the contractor is responsible for both design and construction which may reduce the check and balance between architect and contractor. The design / build contractor may be required to have a corporate professional license to practice architecture and/or engineering, depending on state licensing laws. This type of contractor-led design / build is not currently a permissible delivery method under the Illinois School Code.

The design industry may also refer to design / build as a concept where the district contracts with both a designer and construction manager. In this context, the designer / construction manager entity or team does not hold contracts directly. The designer / construction manager designs the project and provides construction manage-

ment as agency as described in section II of this chapter. The procurement of design services must follow the QBS Law. The procurement of construction management services must follow state competitive selection rules.

**IV. GENERAL CONSIDERATIONS FOR ALL DELIVERY METHODS**

**Using a Full Time District Observer**

Depending on the size and complexity of the project, it may be to the district’s advantage to hire a full-time observer to handle the day-to-day administration of construction. The observer could act as the single point of contact to make field decisions and approve minor changes to the work. The observer should be authorized to make monetary decisions up to a predetermined amount in order to keep the project moving without having to call a special board meeting. The cost to hire an observer could be well worth it if the district has limited experience with the construction process.

**Material Substitutions**

Occasionally, a certain specified material or product may be unavailable at the time it is needed. The contractor may request that another material or product be substituted for that which was specified. The request is normally made directly to the architect. There may be cost differences between the specified item and the substitute item. The architect will advise the district if the substitution is viable and will recommend that a change order be issued if the substitution is acceptable.

**Value Engineering**

This is the process in which the contractors will offer suggestions on how to save money and/or speed up construction by deviating from the plans and specifications without affecting the quality of the work or the overall design. Value engineering is normally requested when the bids on a project come in over budget. The architect will ask for each contractor to review the documents for any cost-saving ideas and provide estimates on the savings associated with the changes. These ideas can be reviewed and decisions made to accept or reject the changes.